A Producer-Friendly Brucellosis Vaccine

A major hurdle has been cleared in the long battle against brucellosis, a contagious bacterial disease that costs U.S. cattle producers some $30 million annually.

The latest weapon is a new vaccine called RB51. Its name is taken from a strain of the *Brucella abortus* bacterium that causes brucellosis. But unlike longstanding vaccines that use *B. abortus* strain 19, the RB51 vaccine doesn't stimulate the animal's immune system to produce antibodies that interfere with the diagnosis of *B. abortus*.

The presence of such antibodies in subsequent blood tests has sometimes been viewed as a sign of infection, rather than of vaccination—making some cattle producers reluctant to vaccinate their herds.

USDA's Animal and Plant Health Inspection Service (APHIS) granted a provisional license in February 1996 to Colorado Serum Company in Denver to make and sell a vaccine containing RB51. ARS researchers at the National Animal Disease Center (NADC) in Ames, Iowa, have a vested interest in the success of this new vaccine, which is gradually being adopted as the official vaccine to replace *B. abortus* strain 19.

Brucellosis, or Bang's disease as it's often called, reduces cattle fertility, causes abortions, and reduces milk production in beef and dairy cattle. People can become infected if they handle, slaughter, or consume unpasteurized milk products from infected cattle. In humans, the disease is called undulant fever and causes flulike symptoms, weakness, and loss of appetite and weight.

No treatment or prophylactic drug has ever been developed for cattle brucellosis.

For over 50 years, veterinarians have tested cattle. Those animals found to be infected were separated from the herd or slaughtered.

Since the early 1940's, vaccines based on *B. abortus* strain 19 have been the chief defense against this devastating disease.

"But the problem with using strain 19 in a vaccine has always been that it induced an antibody response, making identification of truly infected animals more difficult," says ARS veterinarian Steven C. Olsen.

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Animal caretaker Terry Krausman raised this bison from a 1-day-old calf for use in research to develop a brucellosis vaccine for bison. (K7078-7)

Olsen is a member of the research team responsible for developing the new vaccine. The RB51 strain was first identified and isolated in the early 1980's by Gerhardt Schurig, a microbiologist at Virginia Polytechnic Institute and State University in Blacksburg, Virginia.

Lack of antibody response isn't the only advantage offered by the RB51 vaccine. In studies conducted by veterinarians and researchers in Alabama, Kansas, Georgia, Texas, and Florida, the vaccine appeared clinically safe for use in pregnant cows. Only one pregnant animal in 1,000 aborted after vaccination with the live RB51 vaccine.

To help APHIS speed up brucellosis eradication, the ARS research team of Olsen, Mark G. Stevens, Mitchell V. Palmer, Shirley M. Halling, Betsy J. Bricker, and Norman F. Cheville, who was formerly with ARS, were responsible for developing an improved vaccine.

"These researchers performed years of work behind the scenes—vaccinating calves, raising them to breeding age, waiting until they were pregnant, and exposing them to the bacteria to see if the vaccination worked," says veterinary medical officer Carole A. Bolin, who is in charge of NADC's Zoonotic Diseases Research Unit.

The problem of brucellosis extends well beyond the boundaries of this country's cattle ranches. About 50 percent of the bison leaving Yellowstone National Park during the winter to forage in cattle-populated areas of Montana, Wyoming, and Idaho test positive for brucellosis, according to Olsen.

He and fellow ARS researchers are participating in a multiagency program to study the disease in free-ranging bison in Yellowstone. Olsen is cooperating in the program with APHIS; the Montana Department of Fish, Wildlife, and Parks; and the U.S. Department of the Interior's National Park Service and the Biological Resources Division (formerly the National Biological Service), U.S. Geological Survey. The Park Service hopes to eliminate the disease from Yellowstone bison by 2010.—**By Linda Cooke,** ARS.

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